ALGEBRA.

100. Proposed by W. H. CARTER, Vice President and Professor of Mathematics, Centenary College, Jackson, La.

Solve, $x^{x+y}=y^{4a}$, $y^{x+y}=x^{a}$.

101. Proposed by G. B. M. ZERR, A. M., Ph. D., Professor of Mathematics and Science, Chester High School, Chester, Pa.

Prove that $(1+2+3+\ldots\ldots+n)+\frac{n}{2\,!}(1^2+2^2+3^2+\ldots\ldots+n^2)+\frac{n\,(n-1)}{3\,!}$ $(1^3+2^3+3^3+\ldots\ldots+n^3)+\frac{n(n-1)(n-2)}{4\,!}(1^4+2^4+3^4+\ldots\ldots+n^4)+\ldots\ldots\ldots$ $+\frac{n(n-1)(n-2)}{4\,!}(1^{n-3}+2^{n-3}+3^{n-3}+\ldots\ldots+n^{n-3})+\frac{n\,(n-1)}{3\,!}(1^{n-2}+2^{n-2}+3^{n-2}$ $+\ldots\ldots+n^{n-2})+\frac{n}{2\,!}(1^{n-1}\;2^{n-1}\;3^{n-1}+\ldots\ldots+n^{n-1})+(1^n+2^n+3^n+\ldots\ldots+n^n)$ $=(n+1)^n-1$, and substitute for $n=2$, 3, 4, 5, and 6.

*** Solutions of these problems should be sent to J. M. Colaw not later than June 10.

GEOMETRY.

120. Proposed by P. C. CULLEN, Principal Public Schools, Indianola, Neb.

Draw a circle tangent to a given circle and tangent to a given chord at a given point.

121. Proposed by AUGUSTUS J. REEF, Carbondale, Ind.

Construct a triangle having given its three medians. [From Wentworth's *Plane and Solid Geometry*].

122. Proposed by G. I. HOPKINS, A. M., Professor of Mathematics and Physics, Manchester High School, Manchester, N. H.

If perpendiculars are dropped from the vertices of a regular polygon upon any diameter of the circumscribed circle, the sum of the perpendiculars which fall on one side of this diameter is equal to the sum of those which fall on the opposite side. [From Chauvenet's *Treatise on Elementary Geometry*.

*** Solutions of these problems should be sent to B. F. Finkel not later than June 10.

CALCULUS.

90. Proposed by ELMER SCHUYLER, High Bridge, N. J.

Prove that the evolute of the logarithmic spiral is an equal logarithmic spiral. [From Byerly's *Integral Calculus*].

91. Proposed by GUY B. COLLIER, Schenectady, N. Y.

Find the area of a loop of the curve $r^2\cos\theta=a^2\sin3\theta$. [From Hall's *Differential and Integral Calculus*].

*** Solutions of these problems should be sent to J. M. Colaw not later than June 10.